

# Design Workout 2: Paper Prototyping

**App Name:** Breed Detective

**Designed For:** Touch screen, camera-enabled phones

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## Introduction

### App Name

*Breed Detective*

### Designed For

Touch-screen, camera enabled cellular phones with a focus on the iPhone.

### App Overview for *Breed Detective*

*Breed Detective* attempts to identify a dog's breed based on a picture submitted by the user. Users can take a new picture of a dog from within the application or choose a preexisting image from the device's photo library and submit either through the *Breed Detective* interface. In response to this action, the application returns the name of a canine breed it believes describes the dog depicted.

*Breed Detective* is a new application, designed from scratch with little conceptual inspiration and primarily targeted at the iPhone because of my personal familiarity with the platform and its lack of hardware controls. In addition to making the design process easier and more fluid in my opinion because hardware controls cannot be taken into account, by focusing on the iPhone the design focused primarily on the iPhone, I tried to design for handheld, camera-enabled, touch screen devices in general.

### Why It Exists and Problem Description

I chose and designed this application in response to a problem that I experience fairly frequently: Being unable to visually identify the breed of most dogs. Though I am curious, I am not educated enough on the subject of canine breeds to accurately distinguish one type from another. Factors that make such a task difficult for anyone with similar levels of knowledge include *Breed Detective* is an attempt to remove the burden of learning this information by providing a simple tool that identifies dog breeds for the user.

### What It Does or How it Seeks to Solve the Problem

*Breed Detective* seeks to free users from the intellectual responsibility inherent in identifying dog breeds. By identifying a dog's breed based on a picture, *Breed Detective* seeks reduce a potentially research intensive effort by the user to a consistently simple two to three step application interaction involving submitting a photograph and receiving a response. The actual identification process is offloaded onto remote servers and entirely removed from the user experience except for the loading screen and waiting time associated with the remote identification.

## User Selections

### Selection Criteria

I chose five users to test the paper prototype for *Breed Detective* based on several criteria including gender, nationality, age and availability. I anticipate the primary driving attributes of a user of this application to be curiosity and interest in animals, which I would assume occur in a large cross-section of the world's population. Because of this, I tried to guide my user selection with a broad collection of criteria rather than a narrow categorical expectation of user interest.

### Availability

For expediency, I used a single, populated Starbucks in Bethesda, MD to gather users from. Given this self-imposed limitation on potential test cases, and the fact that four out of my five test users were people I did not know beforehand, my selections were at least partially a result of who was present at the time and who looked willing to participate.

### Gender

I wanted to have both male and female participants and therefore made sure to select at least two subjects from each group because of the significant differences in societal influences between the two genders. The final population consisted of three males and two females.

### Nationality

Though limited to who was in Starbucks at the time, I wanted to include a user whose perspective was informed by an upbringing outside the United States because of the potential differences in both relationship to technology and cultural views.

### Age

I wanted a user population familiar enough with touch screen devices and mobile applications that they would acclimate quickly to a new testing experience within a limited amount of time, while still leveraging a broad range of ages. With this in mind, I tried to approach users between high school age and early 50's, as I would assume individuals within this range to be appropriate candidates given past personal experience.

### Test Users

ID	Gender	Age	Nationality	Occupation
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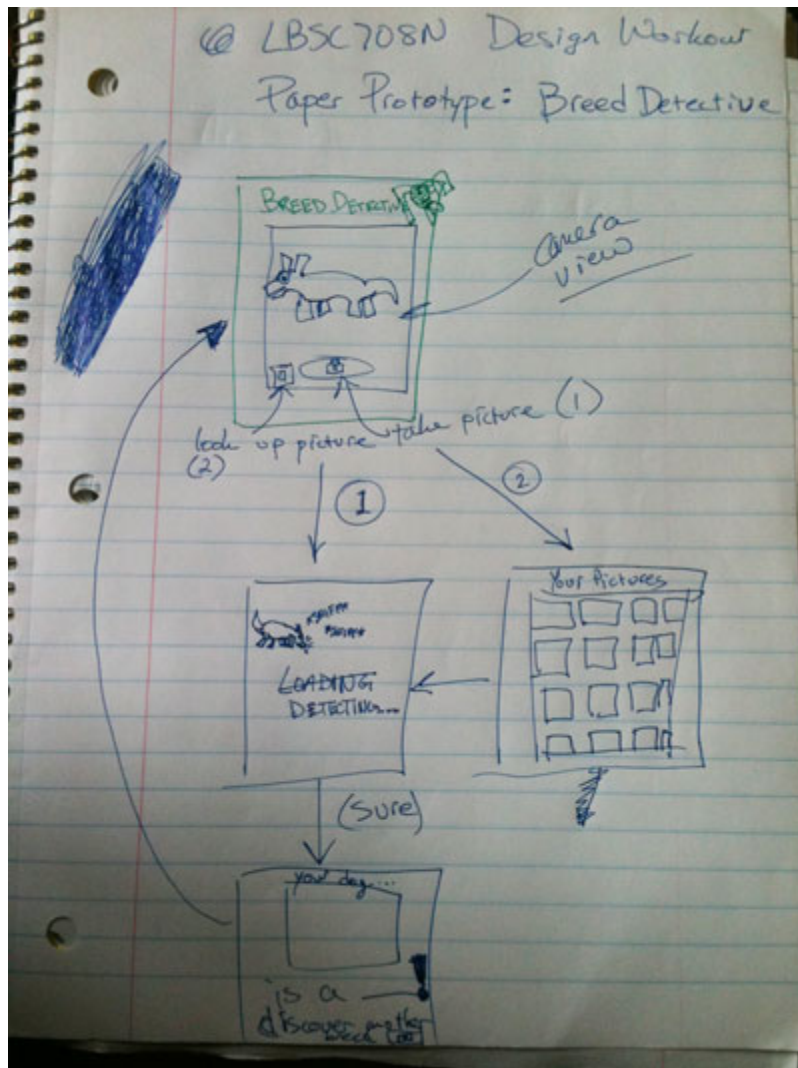
User 1	Female	26	USA	Grad Student (Art - Georgetown)
User 2	Male	29	USA	Grad Student (Political Science - American U.)
User 3	Male	30	Ethiopia	CVS Employee
User 4	Female	36	USA	Nurse Anesthetist (Hospital in VA)
User 5	Male	26	USA	Grad Student (HCI - UMD), Software Engineer

## Prototype Development Process

I approached this project initially without an application in mind and because of this fact, as well as the more isolated working style encouraged by class assignments, my design process differed a bit from the one outlined by the UsabilityNet article<sup>1</sup>. I held no group brainstorming sessions, and instead opted to use a planning document to establish two potential app ideas, and briefly elaborate on the intended functionality and perceived technological and design hurdles inherent in both. Through that step, I was able to both choose an application to run with as well as inform the next step in my prototyping design, a sketch of both program flow and very rough potential screen designs. Because I had outlined the intended functionality in a planning document, I was able to largely achieve the Conceptual Design, Interaction Design and Screen Design steps advocated by UsabilityNet in a single rough sketch, depicted below:

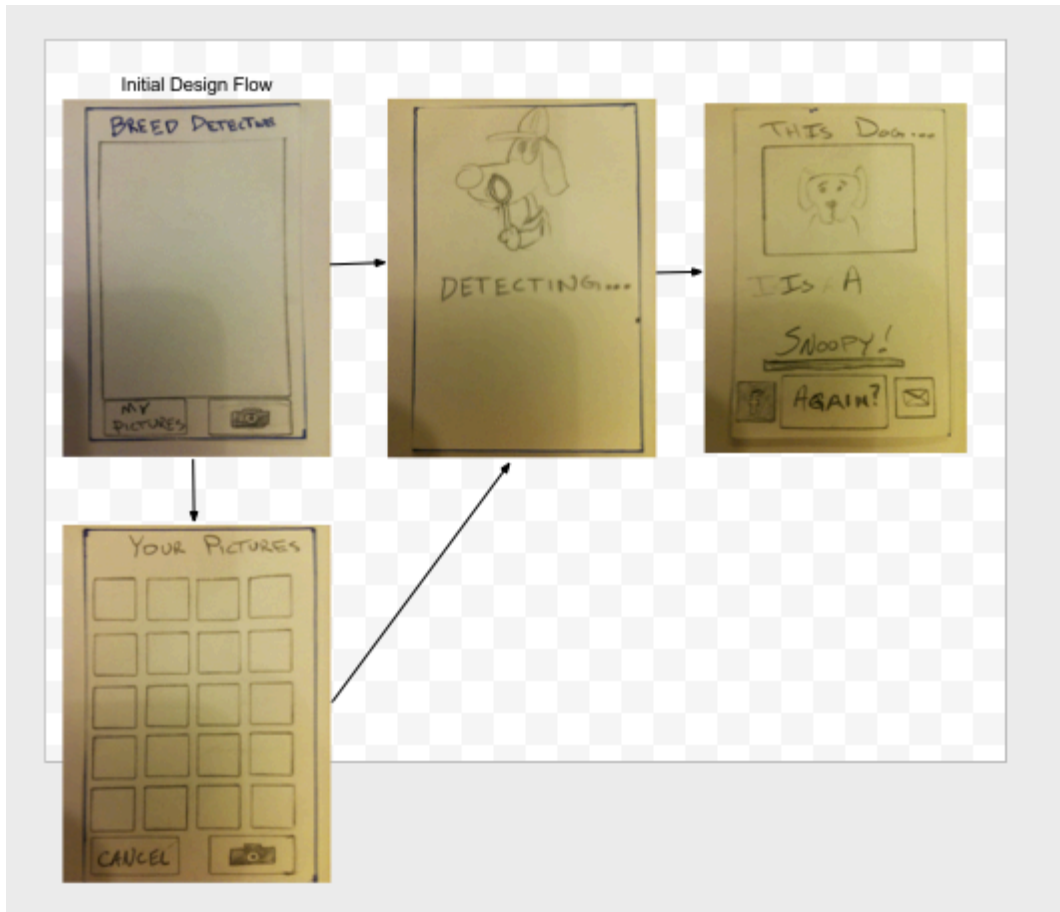
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<sup>1</sup><http://www.usabilitynet.org/tools/prototyping.htm> - Breakdown of Paper Prototyping



The final portion of my initial process, producing the actual screens ended up being a mostly logical and practical evolution of the interaction sketch depicted above. I translated that planned functionality onto paper, making needed adjustments along the way.

The end result of this prototyping effort can be seen below:



## Testing Procedure

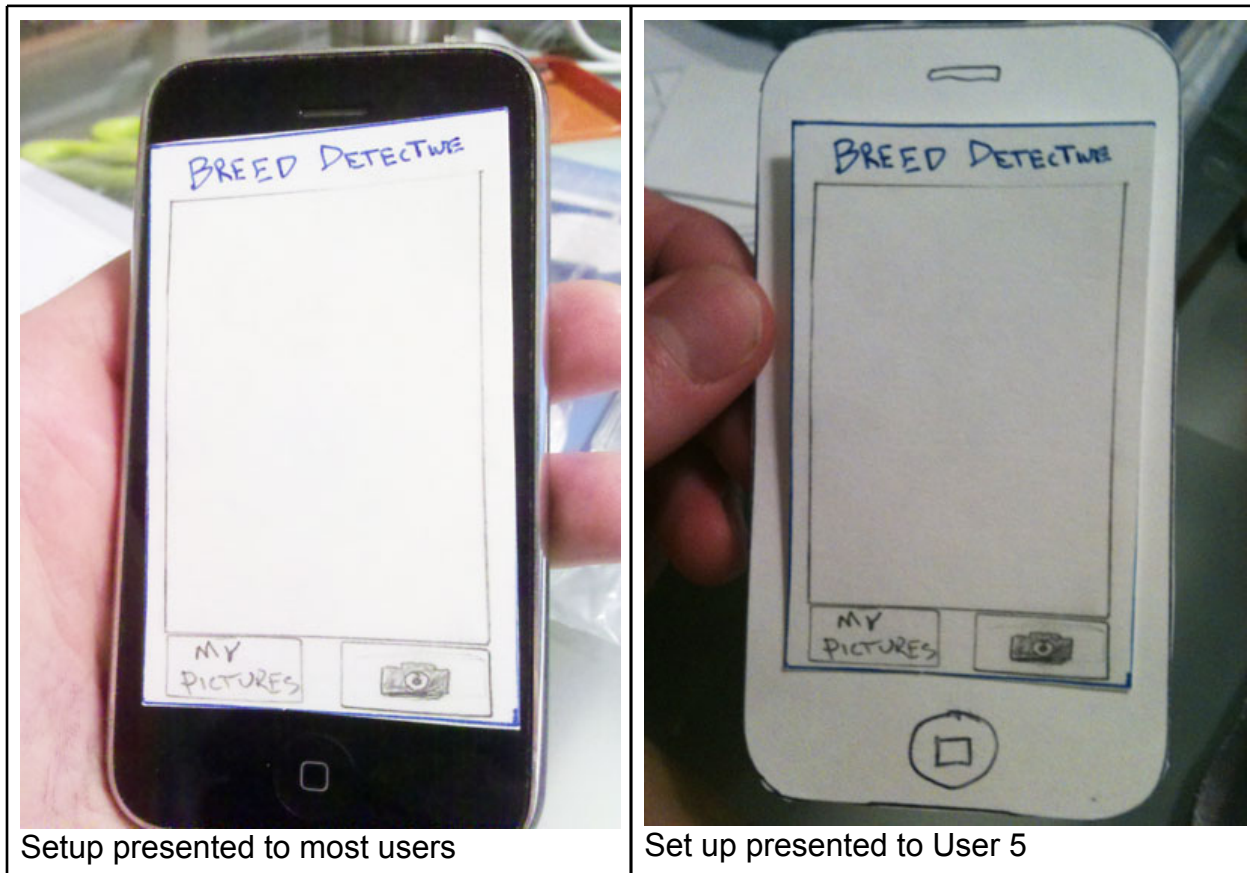
### Overview

I tried to gear my testing procedure toward eliciting a quick, but thorough user interaction from individuals who presumably did not, when they arrived at Starbucks, expect to be interrupted to test a paper prototype. To do so, I approached potential users with the promise of a quick, fun experience that would not be too difficult. Because of the fact that I had little to no contact with these people prior to the user testing, I had relatively fluid and varied personal interactions with them and adjusted my approach according to their attitude. For instance, some users I told to “play” with the prototype, while others I asked to “test” or “try” it. The choice of what to say in each instance was based on gut feeling rather than hard criteria, and is thus difficult to reflect deeply on. In retrospect, having a more rigid script may have provided a more consistent and repeatable testing procedure over the course of a larger study, but the varied nature of my approach also allowed me to observe how the different users needed coaching in different places and gave some insights into user motivation that I might not have gotten otherwise.

Each user, with the exception of User 5 was presented with a real iPhone 3GS with the relevant paper application screen attached to the glass of the device’s true display. Due to a technological issue, User 5 was presented with a paper reproduction of the iPhone 3GS rather than a real device. The application screens were attached and removed in the same manner in

this case as in the others.

The two testing setups are depicted below:



I cannot know for sure what difference this change in procedure might have made to User 5 testing session, but I don't that believe it was significant. User 5 is a fellow classmate and working on his own paper prototype, so his interaction approach is already influenced by knowledge of the testing method and an awareness of the project guidelines.

## General Steps

The testing procedure that I used generally conformed to the following steps:

1. Approach Potential User
2. Ask them to "play with" or help me "test out" an iPhone application that I am developing
3. Explain that the application tells you the breed of a dog if you take a picture of it.
4. Present the user with the iPhone (or paper iPhone) with the initial screen visible
5. Explain that the application is open, that the blank box on the first screen is meant to be the camera feed and to pretend that if they pointed the phone at my face, they would see "on screen" in the empty box.
6. Ask the user to interact with the application as if it were real and currently running on the phone. Elaborate if necessary that I would like them to "tap" the paper screens as if they were being displayed on the screen of the device.
7. Following a user action, if applicable, remove the "screen" currently attached to the

device and replace it with the next appropriate screen (Or remove all screens if the user presses the Home Key of the iPhone).

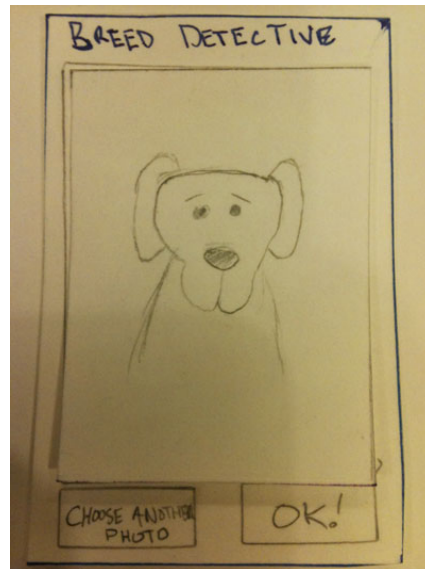
8. If, after having proceeded through a significant amount of actions, the user begins to slow down while one of the two main action branches (take a new picture, or select a preexisting picture) remains unexplored, encourage the user to return to the first screen of the application and attempt the other path.
9. Ask the user for comments or suggestions.
10. Ask the user their opinion of the application.
11. Ask the user if there were any major points of confusion.
12. Throughout, document the user's path through the application mockup

### **Notable Variations**

Much of my approach and method stayed the same throughout the testing experience as a whole, but there were a few notable differences between the subject sessions and some enlightening interactions along the way. While my approach and dialogue between subjects was very similar, some users required coaching in specific places. User 3, for instance, required significantly more coaching throughout, and I suspect it was due to a language barrier. He was very enthusiastic about the application, but his commentary focused on things mostly external to the application's purpose, such as generally making life easier through application development or making sure that the application was "attractive". Though his commentary was useful and important, I'm not sure that this user quite understood the more narrow focus of my testing goals. The other users, by contrast, had little trouble understanding my intent in the testing endeavor, but would commit in varying degrees to interacting with a paper interface, or suspending interest into the back end system of the application. User 2 was a great example of both cases as he tended to avoid actually touching the prototype, instead attempting to progress verbally through the mockup. He additionally showed a skepticism driven curiosity over how *Breed Detective* would achieve the identification portion of its intended functionality, even though I made it clear that not only was that beyond the focus of the test, but that I in fact had no idea how to implement it.

Throughout the process, I also found that there were a couple of sticking points in the interface and nature of the paper method. In going through the interface with User 1, I realized that the application flow was difficult to understand because it lacked significant enough feedback and user control in the picture submitting phase. As a result, I developed a new screen and added it to the prototype before approaching User 2, whom I asked to test the prototype with and without the new screen. The screen added is depicted below:





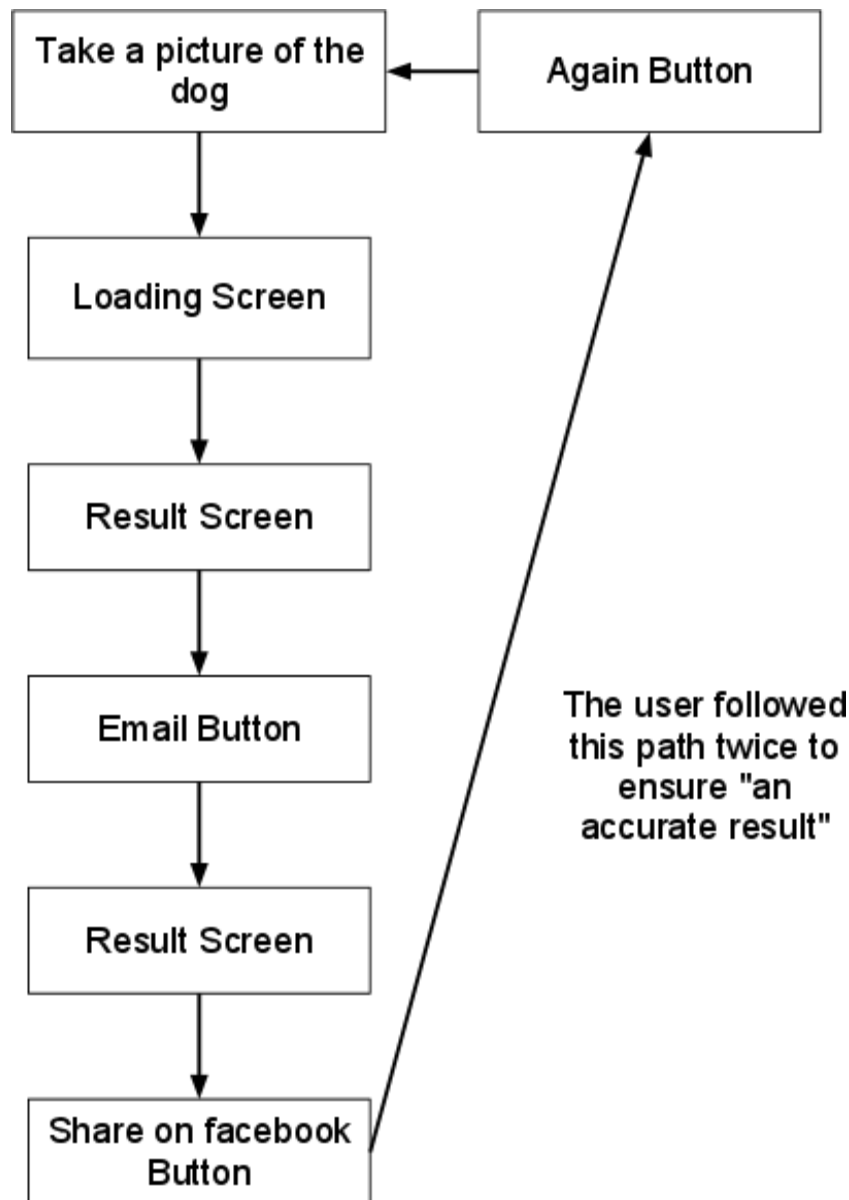
Both User 1 and User 2 indicated that this was a nontrivial improvement to the application flow, so I chose to include this addition in the subsequent user sessions, but did not comment on the change because I felt that the user feedback was strong enough to warrant a permanent change to the design.

## **User Sessions**

For each user, I followed the above general testing protocol and recorded both their specific path through the application and their general commentary on the prototype.

### **User 1**

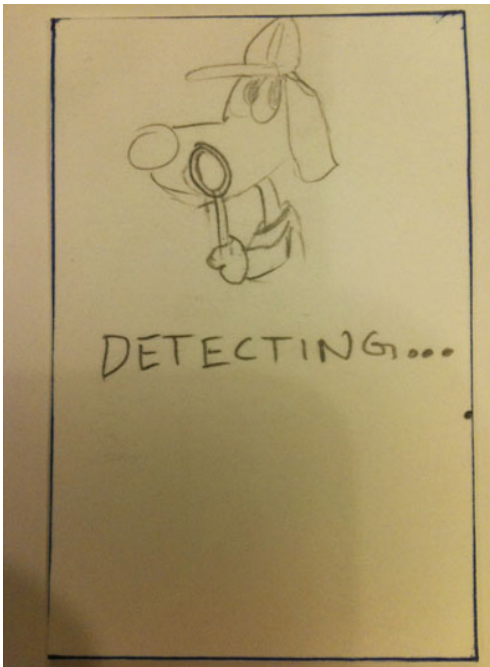
#### **Interaction Progression**



### **User Commentary and Suggestions**

User 1, the first of my female test subjects, seemed pleased with both the idea and execution of the application. She professed herself to be a dog-lover, and that because of this and an inadequate knowledge of dog breeds, she would enjoy using an application like *BreedDetective*. User 1 had no trouble navigating the application and during the interaction suggested one major improvement: the ability to go back and look at the history of the dogs you identified.

She additionally showed an emotional attachment to the cartoon dogs depicted in the mockup, even going so far as to say that the "Detective Dog" was, to her, the most important and engaging aspect of the prototype. The "Detective Dog" can be seen below on the loading screen that occurs between picture submission and result display in the application.



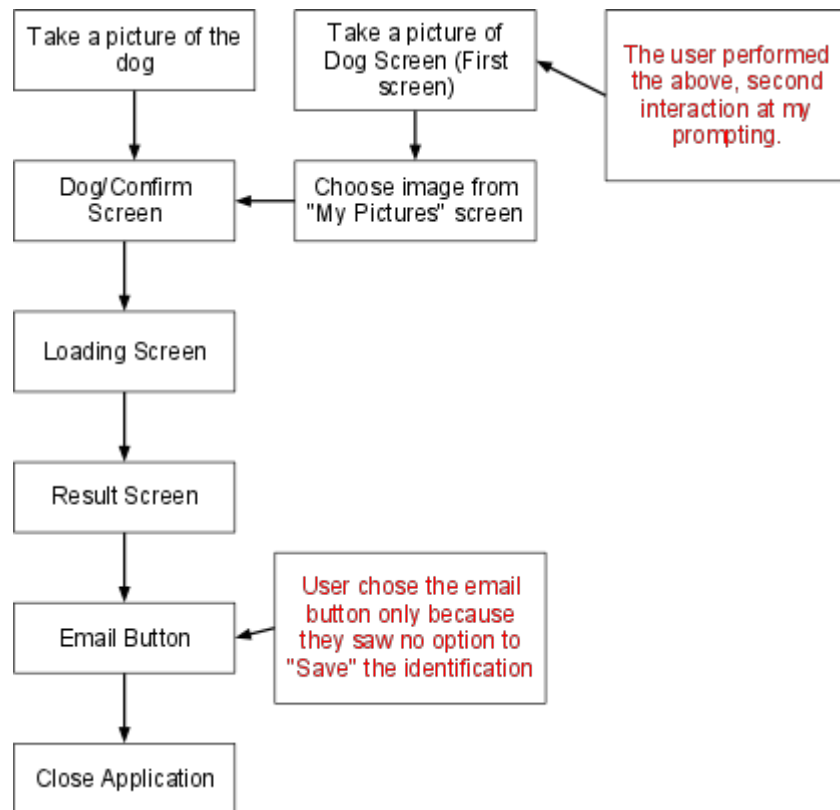
**Detective Dog**

### **Notable Observations**

The testing session with this user was unique because it allowed me to identify two important points about my application. First, through my own difficulties in explaining some of the application flow, I realized how at least one portion of the application was unintuitive, and thereafter improved the application flow by adding a screen to the prototype. Additionally, her response to the application confirmed that not only can users become emotionally attached to an interface, but that it likely affects their enthusiasm for the interaction and their overall opinion of the interface.

### **User 2**

#### **Interaction Progression**



### User Commentary and Suggestions

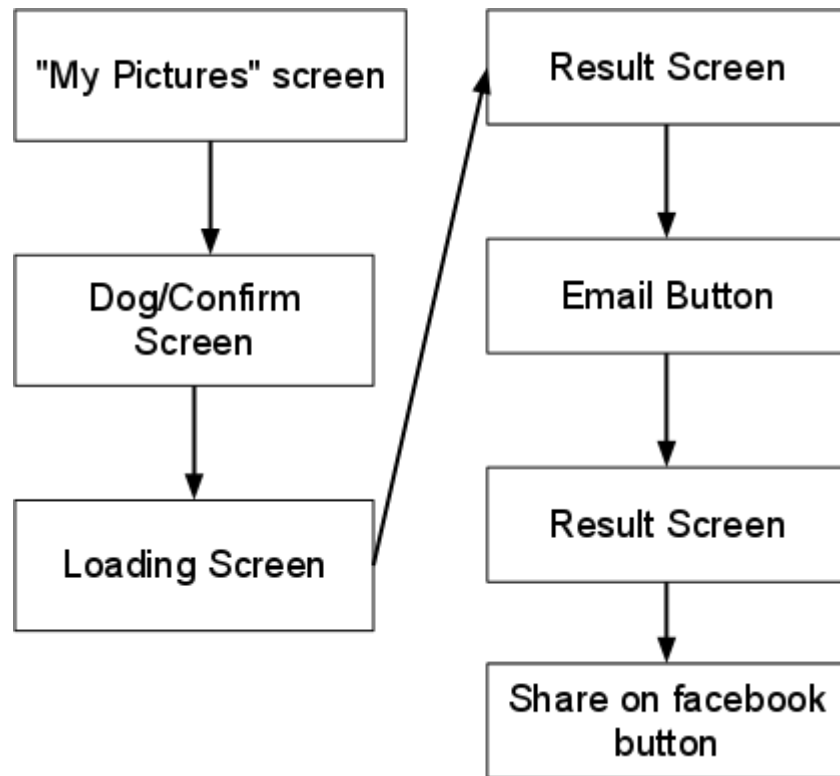
User 2 suggested almost immediately that there should be a way to save the photo and record of the identification. He even seemed frustrated by the fact that there was no way to do so. This user offered little additional commentary beyond this, but confirmed for me that the confirmation screen I added after User 1's session improved application flow.

### Notable Observations

User 2 was the first male test subject of the group and showed no emotional attachment to the interface. He made no mention of liking or interacting with dogs during the course of the testing session. His reactions could indicate a gender bias in user appreciation for this application or perhaps just be representative of a user group that would not be too impressed by the application. It is impossible to tell for certain what his reactions might mean with such a small sample size, but they seemed worth noting down.

## User 3

### Interaction Progression



### **User Commentary and Suggestions**

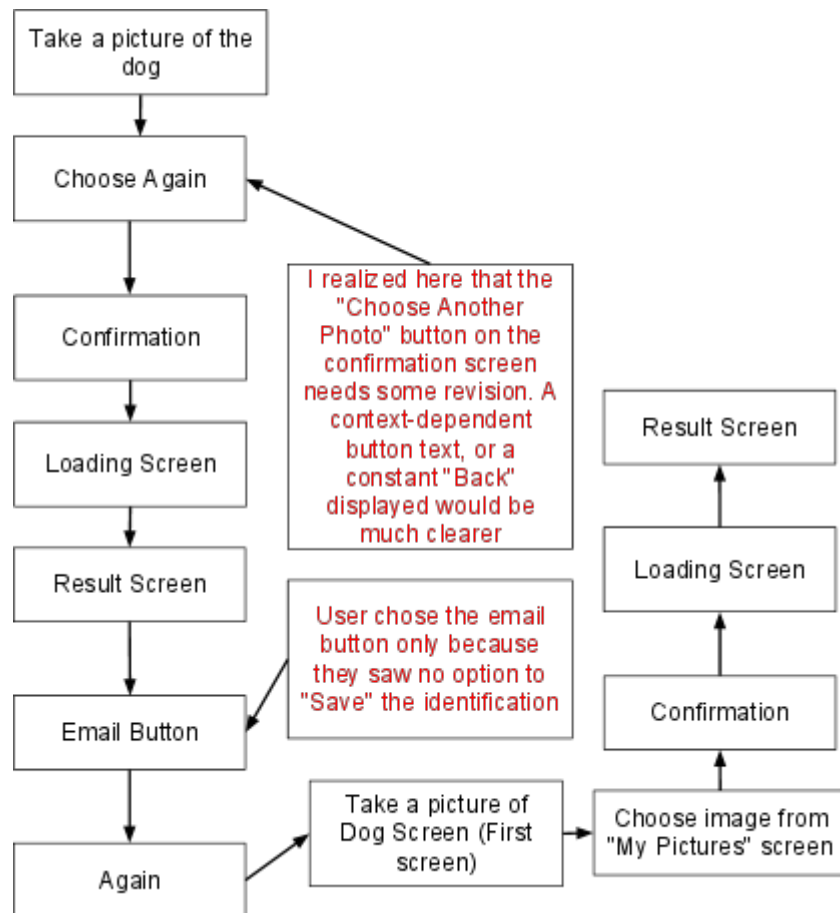
User 3 suggested that I could improve the application by having it make things “more easy”, which I later discovered to mean that a good application should make many tasks very easy to perform. He also suggested that I focus on making the application “attractive”.

### **Notable Observations**

User 3 was the second male test subject of the group and also the only one brought up in a country other than the United States. It was difficult to convey to him that the application was designed for a single purpose, and though he liked it, I gathered that he wanted it to do more everyday tasks. One potential interpretation of this reaction could be that he wanted to see an application like this integrated into the main phone UI, rather than existing as a standalone application. My reasoning here is because he used a brand new Windows 7 Mobile phone (which he was playing with at the time), to show me how the native search function of the phone made many different tasks more convenient. This implies to me that familiarity with technology and cultural upbringing could have a significant impact in user experience and perception of an application.

## **User 4**

### **Interaction Progression**



### User Commentary and Suggestions

User 4 suggested that he wanted a way to save the images and history of his actions, and was a little frustrated by the fact that email was his only avenue for doing so. He also thought that users should be able to click on the dog breed reported by the application to pull up a Wikipedia page or some other resource to discover more information about the breed detected. User 4 further suggested that offering other sharing mediums would be nice as he would have liked to be able to share via text message (MMS) or Twitter, pointing out that some people, like himself, are not avid Facebook users.

He additionally suggested that a more consistent "Back" button be present throughout the initial user interaction, as both the "Again?" and "Choose Another Photo" buttons were too ambiguous, given the context of his interaction. Specifically, the confirmation page presents a "Choose Another Photo" button to the user regardless of whether they came from the camera or the photo library screen. This offers the user no indication of where they might go back to.

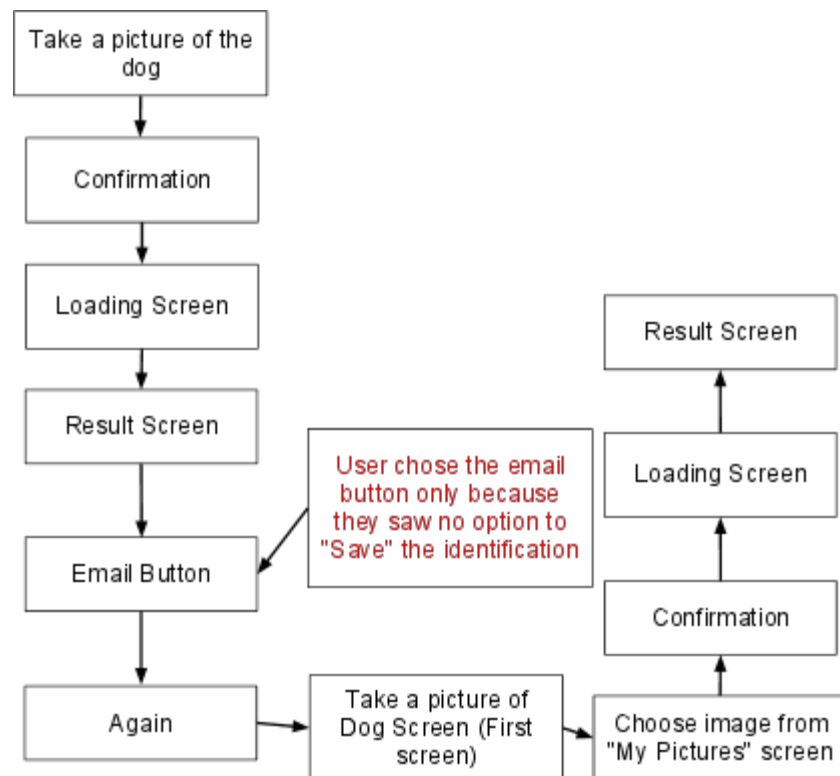
### Notable Observations

User 4 was the third male in the group and like the others, did not show any emotional response to the dog or cartoon aspects of the prototype, suggesting further that 'cuteness' may be an extremely powerful attracting factor, but only for some users.

Being a student of HCI himself, he also explored most deeply into the application and made more interface suggestions than the other participants, implying to me that interface and technological competency may influence a user's expectations of a new application.

## User 5

### Interaction Progression



### User Commentary and Suggestions

User 5 suggested that she wanted a way to get more information about the breeds identified through the application.

### Notable Observations

User 5 was the second female in the group and showed significant emotional response to the dog and cartoon aspects of the prototype. She also, like the first female subject, mentioned being a dog-lover, but lacking knowledge of the breeds. She confirmed that the 'cute' quality of the application was a big attractor for her, further implying, at least in this small sample size, a possible gender bias in user appreciation for this application.

## Conclusion

## **Implications for Future Design**

It is interesting that through the testing sessions one feature was requested by every user: the ability to save the identifications and photographs taken of the dogs. The additional common suggestions of looking up information about breeds to extend the utility of the application are logical next steps and certainly additional elements of a potential next version. Without user input, I may not have included these features in a future design, so this feedback has proven to be invaluable.

My own experience and frustration with presenting the prototype to users has also given me several ideas for a next version of the application. Improvements such as clearer context clues to interaction, a 'back' button, and greater user control indicators are central to what I've learned from having to explain through my own confusion with the interface I designed.

## **Closing Thoughts**

Paper prototyping seems to be a valuable and relatively expedient way to work through a product or interaction design problem. It seems to have limitations when it comes to more complicated interaction, as extremely involved interfaces would be difficult to prototype and frustrating to test with this medium. Because of this, and because I was at least partially designing for the project and the paper prototyping process, I was forced to design a very simple interface. I believe that this resulted in a better user experience and enabled me to include elements, such as the cute dog images, that could further draw in users and retain a high appreciation for the application.

I will certainly be using this process for future applications, both for its excellent utility in orchestrating simple interactions and its forceful imposition of simplicity in design. As someone who tends to over-complicate process design, such restrictions in my design progression could prove essential to both timely and successful design delivery.